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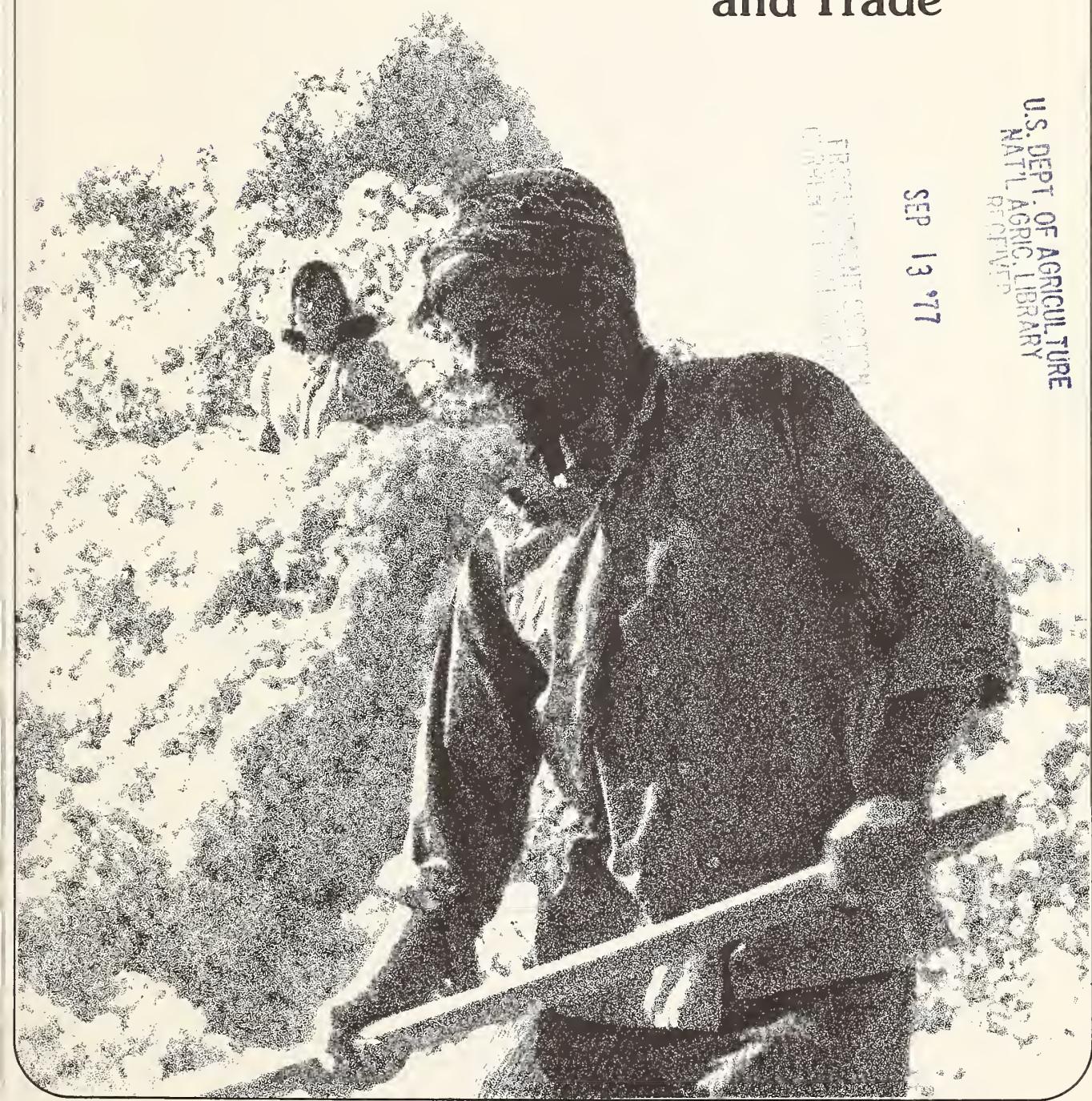
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U.S. Team Reports on Soviet Cotton Production and Trade

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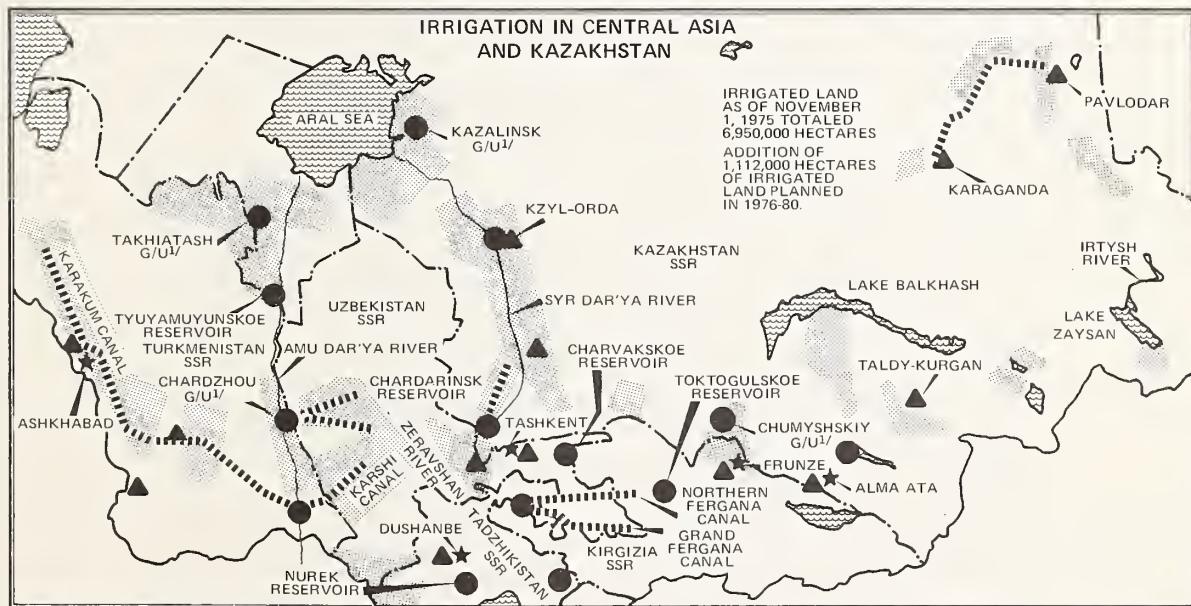
Foreword

The Soviet Union, during recent years, has become the world's largest cotton producing nation and second largest cotton exporting nation. Exports of Soviet cotton compete directly with U.S. exports in traditional U.S. markets in Europe and Asia. As a result of the growing Soviet cotton competition, the U.S. cotton industry has had a continuing interest in Soviet production and trade. Three groups of U.S. cotton specialists have visited USSR cotton areas—in September 1958, September 16-October 13, 1972, and September 1976.

The tight world cotton supply situation in the 1976/77 crop year, coupled with earthquakes and torrential rains in Soviet cotton growing areas early in the season, focused special attention on Soviet cotton supplies for 1976/77. The effect of the earth tremors and weather on the crop has already been reported in U.S. Department of Agriculture press releases. This publication describes current Soviet cotton production practices and discusses the outlook for Soviet cotton production and exports during the next 4 years. Findings of the two earlier groups appear as "Cotton in the Soviet Union—report of a technical study group," 1959, and FAS-M 254, 1973.

Thanks are expressed to the members of the U.S. team, whose names are listed in this report, and especially to the U.S. industry members who went on this mission at their own expense. Appreciation also is expressed to the Soviet cotton officials and organizations who received the U.S. team so cordially. Some of the officials visited the United States in October 1976 and were accompanied by George E. Deariso, Agricultural Marketing Specialist, Foreign Market Development, Cotton. Finally, Alan W. Trick, U.S. Agricultural Attaché in Moscow, provided valuable assistance to the U.S. team.

Joseph H. Stevenson, Director
Cotton Division
Foreign Commodity Analysis
Foreign Agricultural Service



IRRIGATED REGIONS

..... LARGE CANALS

● LARGE HYDROELECTRIC POWER STATIONS AND RESERVOIRS

▲ INSTALLATIONS FOR INDUSTRY

¹/G/U = HYDROELECTRIC POWER STATION.

SOURCE: PRAVDA, MAY 25, 1976.

Contents

	Page
Summary	1
Problems with Soviet costs and prices	1
Production	
Geography and climate	4
Cotton farms visited	6
Diseases and insect problems	6
Irrigation	10
Cultural practices	10
Fertilizer	12
Profit and cost of production	12
Ginning	13
Prices and margins	14
Market structure	15
Trade	16
Future goals	16
Consumption	21
Appendix:	
Tables	24
Places and organizations visited by the U.S. Cotton Team to the USSR	29
Members of the Soviet Cotton team to the U.S., September 28 - October 12, 1976	30

U.S. team reports on—

Soviet Cotton Production and Trade

Summary

Cotton is the success story of Soviet agriculture. The USSR has been the world's largest cotton producing nation during 5 of the last 8 years. During the 1975 crop year, when U.S. exports declined, the USSR became the world's largest exporting nation.

About 30 percent of the Soviet crop is exported, mostly to Eastern Europe but in 1973, the Soviet Union replaced the United States as the largest supplier to Western Europe and, during 1973-75, supplied one-half as much to Japan as did the United States.

While the 10th 5-Year Plan calls for a crop of 9 million metric tons of seed cotton (13 million bales of lint) by 1980, the 1971-75 plan was exceeded by an annual average of 13 percent. If the plan for 1980 is exceeded by this amount, the 1980 crop would be 10 million metric tons of seed cotton, or about 14.8 million bales of lint, compared to 8.3 million tons of seed cotton, or 12.1 million bales of lint in 1976/77. This would represent a 5-percent annual average rate of increase in production from 1976 through 1980. From 1966 through 1976 the annual growth rate averaged 3.0 percent.

Mill consumption of cotton in the USSR has surpassed consumption in the United States since 1969/70 and continues to rise steadily. Cotton accounts for about one-half of total Soviet per capita consumption of all fibers compared to only one-third in Eastern Europe, Western Europe, and the United States. Manmade fiber consumption has been steadily expanding, and plans are for a further 50-percent expansion in production from 1975 to 1980. Even then, however, per capita consumption of manmade fiber will be well below what it is in developed countries generally. To the extent that manmade fibers slow up a further expansion in cotton consumption, given a continued expansion of production, there could be that much more cotton released for export in the future. By 1980 it is likely that the USSR will be producing nearly 15 million bales of cotton compared

with 12.1 million bales in 1976. It seems almost certain that some of this increased production will be exported in competition with U.S. cotton exports.

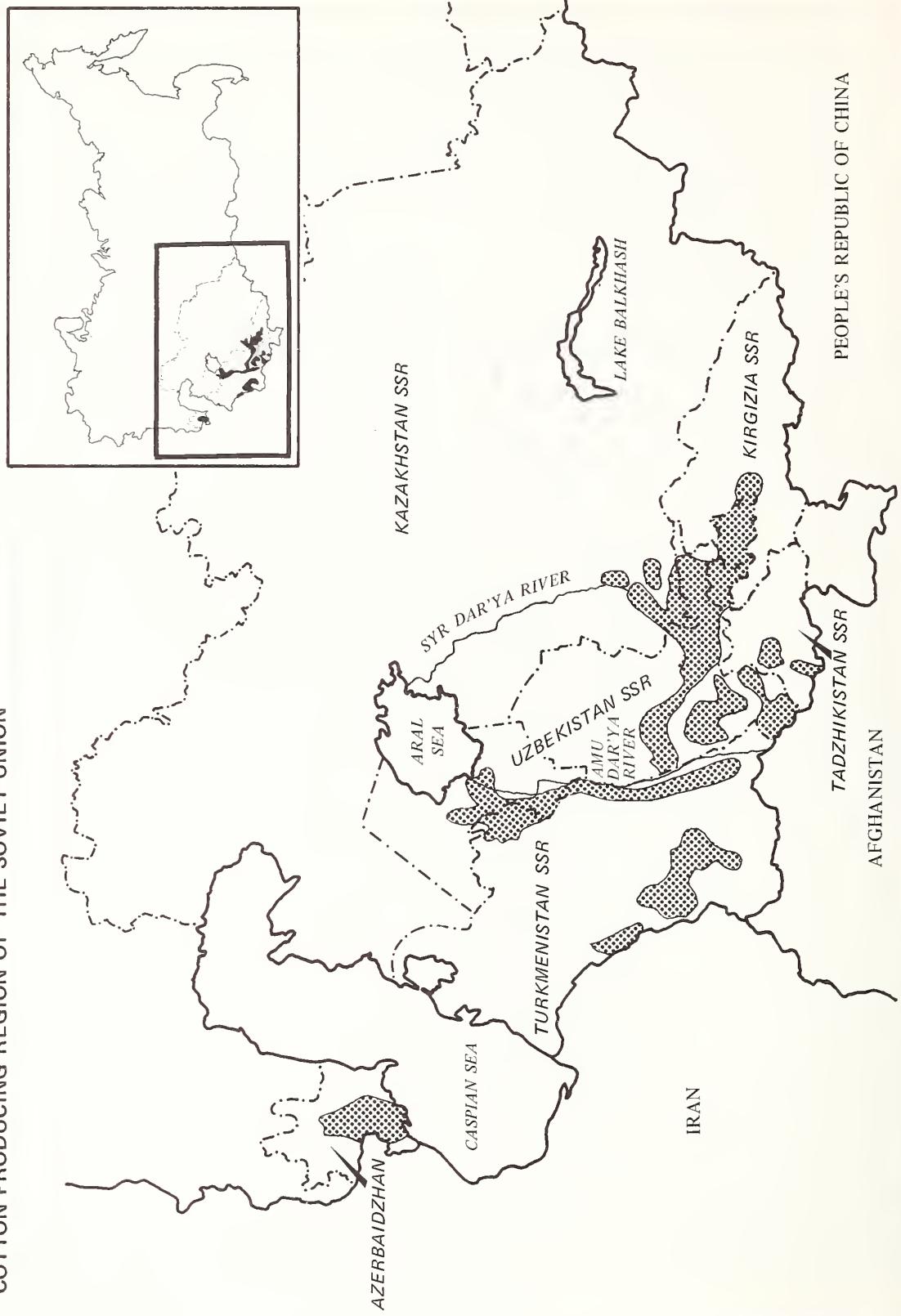
An attempt is made in this report to put Soviet costs of production on a U.S. cent-per-pound basis. However, it should be kept in mind that U.S. and USSR systems are different and any exchange rate chosen is quite arbitrary, so that a direct comparison of Soviet and U.S. costs provides only a very rough approximation.

Problems with Soviet costs and prices

The basic problem in comparing U.S. and Soviet costs and prices is the exchange rate for Soviet currency. The official USSR exchange rate as given by the Soviet authorities to the United Nations and as applied to purchases of rubles inside the Soviet Union was \$1.34 per ruble at the time of the team visit. However, all imports from market-oriented economies are paid for in dollars or other free market currencies, and payment for all exports to such countries also is made in these currencies. Thus, the official exchange rate is a rate which, for the most part, applies only to tourists, to foreigners living in the USSR, and to foreign embassies operating there. Since there is no "free market" rate, a realistic conversion rate for rubles and dollars is somewhat arbitrary. Although the official rate is \$1.34 per ruble, when traded on West European exchanges, the ruble is discounted considerably. A rate of 40 U.S. cents per ruble is perhaps a more realistic level.

Besides being aware of the difficulty of estimating a precisely indicative exchange rate, the reader should keep in mind that the exchange rate has minimal, if any, impact on the decisionmaking of individual State or collective farms. Also, comparisons of Soviet and U.S. costs and prices are difficult because of differences in accounting and cost allocation.

COTTON PRODUCING REGION OF THE SOVIET UNION



UNITED STATES AND UNION OF SOVIET SOCIALIST REPUBLICS:
LONG-TERM TREND IN COTTON PRODUCTION 1947-1976



*BALES OF 480 LBS. NET.

Geography and climate

Most Soviet cotton is produced in Soviet Central Asia in an area that has a climate comparable to New Mexico's. Some is also produced in Azerbaijan located in Transcaucasia. The most southern cotton growing area in the Soviet Union is on about the same latitude as Fresno, Calif. and the northern boundaries of Arkansas and North Carolina. The northern areas of production are on about the same latitude as Boise, Idaho; Milwaukee, Wisc.; and Buffalo, N.Y. These latter areas are well to the north of any other major cotton producing area in the world.

While Soviet cotton growing areas are at a northerly latitude, midsummer temperatures approximate those in U.S. irrigated cotton growing areas. This is because most Soviet cotton areas are oases in a large desert basin at altitudes of 230 meters (755 feet) at Ashkhabad to 428 meters (1,404 feet) at Tashkent and 300 meters (984 feet) in the Vakhsh Valley near Dushanbe.

Annual rainfall averages only about 3 to 15 inches. There is little cloud cover or rainfall for cooling, and absorption of the sunlight provides very hot daytime temperatures. The basin is surrounded by high mountains on the east, west, and south. These mountains account for the light rainfall. Warm winds from the direction of the Indian Ocean and the Mediterranean Sea unload their moisture before rising over the mountains and become dry and warmer as they descend into the basin. There is very little mountainous area north of the basin, which results in low winter temperatures as the hard winds blow in from northern Siberia. Winter temperatures fall considerably below those in the California/Arizona cotton belt and are also lower than those in Lubbock, Texas.

Maximum and minimum monthly temperatures were not available to the team, but mean monthly temperatures are shown in table 1. Mean summer temperatures for Tashkent, Chardzhou (about halfway between Tashkent and Ashkhabad), and Ashkhabad during May-September were equal to or above those for Lubbock, Texas, but were slightly below those for Phoenix and about equal to or, in some cases, above those for Bakersfield.

Killing frost dates and soil temperatures also were not available, but monthly mean temperatures in the spring and fall indicate that the Soviet cotton growing season is shorter than in the U.S. season. This



Soviet scientists have successfully bred long staple cotton suitable for the short growing season of Central Asia. Top, U.S. team member Angel Byrne with noted Soviet cotton breeder V. P. Krasichkov; middle, left to right, Director Kurtgeldiev of the Scientific Research Institute and B. N. Karliev, Chief Directorate of Agricultural Science for Turkmenistan. Poster, at bottom, reads "Welcome dear cotton growing comrades." The cotton boll is virtually the symbol for the region, being used in designs of handmade carpets, to decorate teacups, and as principal motif for many other art forms.

Table 1. NORMAL AVERAGE TEMPERATURES AND PRECIPITATION IN COTTON AREAS OF THE USSR
WITH U.S. COMPARISONS, BY MONTH

Month	Temperature, °F					
	USSR			U.S.		
	Tashkent	Chardzhou	Ashkhabad	Phoenix	Bakersfield	Lubbock
January	34	38	36	51	48	39
February	37	38	40	55	52	43
March	47	52	49	60	57	49
April	58	63	61	68	63	60
May	68	74	74	76	70	68
June	77	82	83	85	77	77
July	81	84	88	91	84	80
August	77	80	84	89	82	78
September	67	70	74	84	71	71
October	55	58	60	72	67	61
November.	43	47	46	60	56	49
December.	34	37	37	52	48	41
Precipitation, inches						
January	1.93	0.55	0.87	0.71	0.96	0.55
February	2.01	.35	.83	.60	1.03	.50
March	3.35	.83	1.85	.76	.83	.89
April	2.48	1.18	1.50	.32	.85	1.08
May	1.18	.24	1.10	.14	.19	3.17
June . . . . .	.43	.02	.24	.12	.06	2.78
July . . . . .	.16	.04	.08	.75	.02	2.23
August. . . . .	.08	—	.04	1.22	.01	1.87
September . . . . .	.12	—	.20	.69	.08	2.19
October	1.10	.20	.71	.46	.26	2.05
November.	1.89	.39	.59	.46	.69	.49
December.	2.09	.55	.75	.82	.74	.61
Total	16.82	4.35	8.76	7.05	5.72	18.41

means that the success of the crop is highly dependent upon the weather during September and October. Warm temperatures during these months can result in maturation of late opening bolls and high yields. Freezing weather during mid-October 1975 stopped growth 10 to 15 days earlier than usual and was the principal factor in reducing yields to 865 kilograms per hectare compared with 923 kilograms per hectare in 1974 and 895 in 1976.

Even though cotton, like other crops grown in the USSR, is plagued by a short growing season, Soviet scientists have done a remarkable job of overcoming this problem by breeding short season cotton varieties adaptable to Soviet conditions. In doing so, however, some of the more desirable characteristics have been partially lost. Foreign buyers say some Soviet

medium-staple cotton is rough, and the extra long staple cotton is said to have a poor color.

Nights are generally cooler in Soviet Central Asian cotton growing areas than in some U.S. irrigated areas, and this may be an advantage. Night temperatures were said to be about 20° to 24° Centigrade (68°F. to 75°F.) and day temperatures generally ranged around 38°C. to 44°C. (100°F. to 111°F.). Research at Lubbock has shown that daytime temperatures of 95°F. and nighttime temperatures of 72°F. are optimum.

Soviet cotton is planted during April and most of it is harvested during September and October. All cotton is irrigated, however, most areas receive some rainfall. In Tadzhikistan, the rainfall received during April is utilized for planting.



Cotton farms visited

The team visited six cotton farms, the characteristics of which are shown in table 2. The farms had from 4,200 to 10,000 hectares under cultivation and from 2,150 to 6,700 hectares in cotton. By comparison, the average U.S. cotton farm has about 32 hectares (80 acres) in cotton, and the average U.S. irrigated cotton farm in California and Arizona has about 80 hectares (200 acres) in cotton. Overall, 64 percent of the cultivable land on these six farms was in cotton and most of the balance was in grain, alfalfa, and vegetables. Yields varied from 2 to 4 metric tons of seed cotton per hectare or 570 to 1,140 pounds of lint cotton per acre. Average yield for the whole USSR is about 4 bales per hectare or 800 pounds of lint per acre. From 50 to 100 percent of the cotton on these farms was machine harvested compared to an average of 50 percent for the entire country. From 450 to 2,300 workers per farm were engaged in cotton production. This is equivalent to 3.6 to 21 workers per 100 acres of cotton.

Prices received at the farm level for cotton varied from the equivalent of 22 to 42 cents per pound, converting at 40 cents per ruble or from 73 cents to \$1.41 converting at the official exchange rate of \$1.34 per ruble. Prices are established by region according to productivity, with regions having less productive land receiving higher prices. The cost of production, as defined by the Soviets, varied from the equivalent of 10-23 cents per pound converting at an exchange rate of 40 cents per ruble or from 33-76 cents converting at the official rate of \$1.34. However, costs for four of the five farms that provided costs figures varied rather widely. The average U.S. cost of production, including land and management, was 46 cents in 1974, 54 cents in 1975, and an estimated 58 cents in 1976.



U.S. cotton team and Soviet specialists, Moskva collective farm in Turkmenistan. The extra long staple cotton of this area is grown under irrigation, water coming from a 900-kilometer-long canal.

Diseases and insect problems

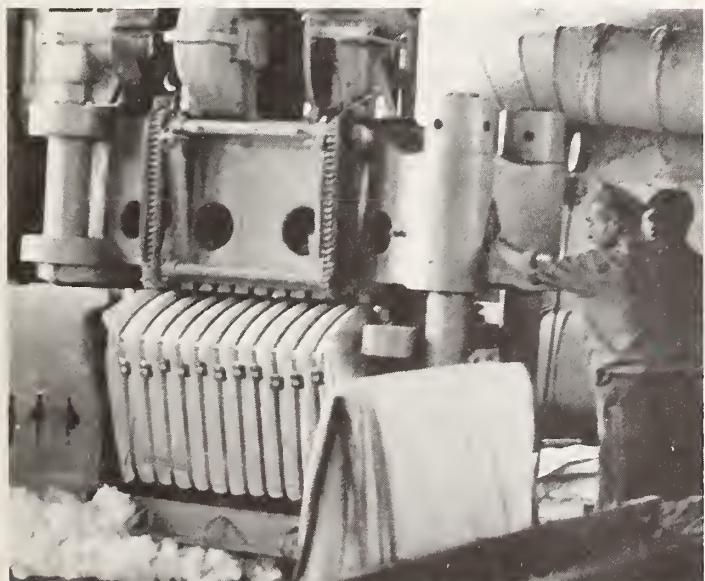
Major Soviet cotton production problems are *Verticillium* wilt, salinity, bollworms, spider mites, and aphids. As a result of the dry weather, the Soviet Central Asia cotton growing area, like U.S. irrigated cotton growing areas, does not have boll weevils.

Attempts have been made to control *Verticillium* wilt through breeding, but the problem still exists and probably has some effect on reducing yields. However, field trials on Soviet cotton in the United States indicate that the strains of *Verticillium* found in the Soviet Union may not be as virulent as the stronger of the two strains found in the United States. This may be the reason the Soviets can maintain a higher percentage of their cotton land in cotton production than can U.S. farmers.

About 65 percent of the Soviet farm lands where cotton is produced seems to be maintained in cotton



The Soviet Union has 170 cotton gins, and these operate for 11 months of the year. Top and right, scenes in a cotton gin of Tashkent; U.S. team with the gin's Director, Comrade Kasimov (facing camera). Right, worker at the gin.



Soviet cotton being prepared for export in a gin in Bukhara. The USSR has been the world's largest cotton producer during 5 of the last 8 years, and cotton exports were sufficient to pay for 35 percent of the grain imported during 1974 and 1975.

Table 2. USSR: CHARACTERISTICS OF SIX COTTON FARMS VISITED BY U.S. COTTON TEAM, SEPTEMBER 1976

Item	Farm name and location					
	"Fifth Anniversary" Tashkent, Uzbekistan	"Engels" Bukhara, Uzbekistan	"October" Samarkand, Uzbekistan	"Kuybyshov" Vakhsh Valley Tadzhikistan	"Put Leninsma" Ashkhabad, Turkmenistan	"Moscow" Bayram-Ali, Turkmenistan
Area in farm, hectares	5,556	4,200	5,000	5,500	10,000	13,800
Area under cultivation, hectares	4,000	3,320	2,150	4,400	5,000	9,600
Area in cotton, hectares						6,700
Types of cotton produced						Upland
Seed cotton production, metric tons						
Yield, metric tons per hectare	4.4	3.6	2.7	3.8-4.0	2.1	2.06
Percent of cotton machine-harvested	90	50	80	-----	100	80
Number of harvesters on farm	100	40	35	12	80	130
Number of tractors on farm	186	-----	180	230	270	400
Number of workers	1,800	4,000	1,550	3,340	680	1,560
Number of workers in cotton	800	2,200	1,250	2,300	450	1,150
Number of machine operators	300	280	-----	-----	-----	220
Man-hours per 100 kilograms, seed cotton ²	25-28	-----	24-25	-----	-----	-----
Average salary per worker, rubles per month	-----	130	200	200	230	205
Sale price for seed cotton, rubles per metric ton	450	4,812	5,520	6,674	560	760
Equivalent sale price for lint cotton, U.S. cents per pound of lint ³	-----	-----	-----	-----	-----	-----
At \$1.34 per ruble	73	141	86	115	94	132
At .40 cents per ruble	22	42	26	34	28	39
Cost of production, seed cotton, rubles per metric ton	240	-----	360	8,330	460	470
Equivalent cost of production, lint, U.S. cents per pound ⁴	-----	-----	-----	-----	-----	-----
At \$1.34 per ruble	33	-----	56	50	75	76
At .40 cents per ruble	10	-----	17	15	22	23
"Profitability" rate percent ⁵	95	-----	-----	93	-----	-----
Other	(11)	-----	(12)	(13)	(14)	(15)

Note: ----- = Information not available.

¹ 30-100-horsepower plowing tractors and 56 wheel tractors. ² According to another source, labor input is 330 hours per metric ton or 1,197 hours per hectare to produce Upland and 410 hours per ton or 1,432 hours per hectare for ELS. ³ Including bonuses. ⁴ 25 percent upland at 549 and 75 percent ELS at 900. ⁵ 590 for Grade 1, 454 for Grade 2, and 220 for Grade 4.

⁶ 85 percent Grade 1 at 700, 10 percent Grade 2 at 580, 3 percent Grade 3 at 50, and 2 percent Grade 4 at 32. ⁷ Based on ginning rate of 32 percent, a value for cottonseed of 100 rubles per metric ton. At 100 rubles per metric ton of seed cotton, the 680 kilograms of cottonseed in each metric ton of seed cotton are worth 68 rubles. Deducting the 68 rubles from the price of seed cotton, multiplying the difference by \$1.34 or 40 cents and dividing by 320 kilograms, or 705 pounds, of lint in each metric ton gives the value of the lint in U.S. cents per pound. ⁸ Consists of 1.65 for wages, 25 for fuel, 22 for machines and depreciation, 1.5 for repair of machinery, 20 for mineral and organic fertilizer, 5 for seed, and 78 for transportation and other expenses. Some costs are 3-3.5 rubles/hectares for herbicides, 16 rubles/hectare for defoliation, and 8-10 rubles/hectare for pesticides and their application. According to the Tadzhik Research Institute, the average cost for Tadzhikistan was 450 rubles per metric ton, or 1,497 rubles per hectare, for upland and 551 rubles per metric ton, or 1,672 rubles per hectare, for extra long staple. In addition, the State spends 162 rubles per hectare for ELS and 142 rubles per hectare for services connected with cotton production. These include schools and rest houses.

Table 2. USSR: CHARACTERISTICS OF SIX COTTON FARMS VISITED BY U.S. COTTON TEAM, SEPTEMBER 1976—Continued

⁹ Assumes the cost of production for cottonseed is equal to its value of about 100 rubles per metric ton. Based on a ginning rate of 32 percent, was defined as the sale price minus cost of production divided by cost of production. The team was not able to arrive at the same percentage figures as those given.

¹⁰ “Profitability rate”

¹¹ Families each have 0.07 hectare for house and garden. Farm has 1-million-ruble housing fund, which came from profits. Bonuses are 1 million rubles out of 5-million ruble profit. Farm has 1,100 hectares in alfalfa, 250 in barley, and 165 in corn, plus 2,000 cattle and 2,000 hogs.

¹² Farm has 5,000 hectares of arable land, including 1,500 hectares in grain. There are 7,000 people living on farm, including 900 families. Houses have electricity, gas, running water. Farm has 35 cars, 18 clubs, and will invest 2.2 million rubles in schools, stadium, and a swimming pool. Farm has 2 million rubles in bank. Receives 1.5 percent annual interest.

¹³ Houses are furnished free. The Government has a special fund for the construction of houses. This fund is not related to the farm expenses. Cotton and cattle are considered a good combination. Of 7 million rubles gross income in 1975, 5 million were from cotton, 500,000 from cattle, 1 million from processing plant, and 500,000 from vegetables and other.

¹⁴ 4,000 people living on the farm. Of 10,000 hectares under cultivation, 1,600 are under alfalfa, 300 under grain, and 250 under fodder. Of the 460-ruble-per-metric-ton “prime cost” of production, 52 percent is labor. Harvesters are depreciated over 6 years and large tractors over 8.

¹⁵ Farm has total of 8,000 people, including 2,500 pupils in five schools; hospital for 50; 60 autos. The Government provided 27 million rubles to start the farm. This has been repaid from farm profits. The 470 ruble-per-metric ton cost includes 45 percent for wages, 2 percent for seeds, 6 percent for fertilizer, 5 percent for repairs, 3 percent for petroleum, 9 percent for amortization, 14 percent for directors' salaries, and 16 percent for miscellaneous.

production and about 35 percent in alfalfa or other crops used for rotation. This is a substantially higher percentage in cotton than in the United States where some farmers consider that maintaining about one-third of the land in cotton production and two-thirds in crops used for rotation is agronomically best. Such a high percentage of Soviet land in cotton seems to result from the desire of planners to have regions of crop specialization and may result in long-range difficulty in improving yields. The amount of grain grown on irrigated land in Central Asia has been increasing during the past 10 years (table 3).

While the shorter growing season has some adverse effect on cotton quality, it and the severity of the winters seem to have the beneficial effect of holding down insect populations. Pesticides are, in general, applied only on an average of about one to 1½ times during the season. Aphids and spider mites are considered a rather minor problem, both of which are controlled with "ROGOR" and sulphur preparations, and ladybugs are being used experimentally to control aphids. Trichogramma is being used experimentally for the control of bollworms.

The United States and the Soviet Union apparently have very similar weed control problems, and both countries use preplanting and preemergence applications of herbicides. However, in the United States additional applications of postemergence herbicides may be made up to three times prior to defoliation while use of postemergence herbicides in the USSR is apparently much less extensive. The team was told that the use of herbicides is increasing, but that they are used sparingly. They are believed by the Soviets to be harmful to the environment.

Irrigation

Most Soviet cotton areas receive some precipitation during the growing season (table 1). However, most of the water used to grow cotton comes from

rivers or irrigation canals that are fed by melting snow from the mountains of Central Asia. Cotton is irrigated from four to eight times during a season, and about 3 to 6 acre-feet of water are used depending on soil conditions and weather. This is about the same variability as is found in the United States where about 3 feet is sufficient in some areas, whether on rainfed or irrigated cotton, and as much as 5 to 6 feet may be required for irrigated cotton in Arizona. One reason that such large amounts of water are sometimes required is that temperatures may sometimes reach or exceed 110°F. both in the United States and the USSR and that such temperatures, especially when accompanied by hot dry winds (called Sikhovey in the USSR), require large amounts of water to compensate.

The team did not learn a great deal about the salinity problem. Some areas visited were pumping water from wells in order to lower the water table level and prevent salinity; the comment was made that the water table is rising and causing some salinity problems. However, salinity did not seem to be a major problem in the areas visited.

Furrow irrigation is practiced almost exclusively in the USSR, however, Soviet team members did mention that sprinkler systems are used in some rolling cotton land where furrow irrigation is not practical.

Cultural practices

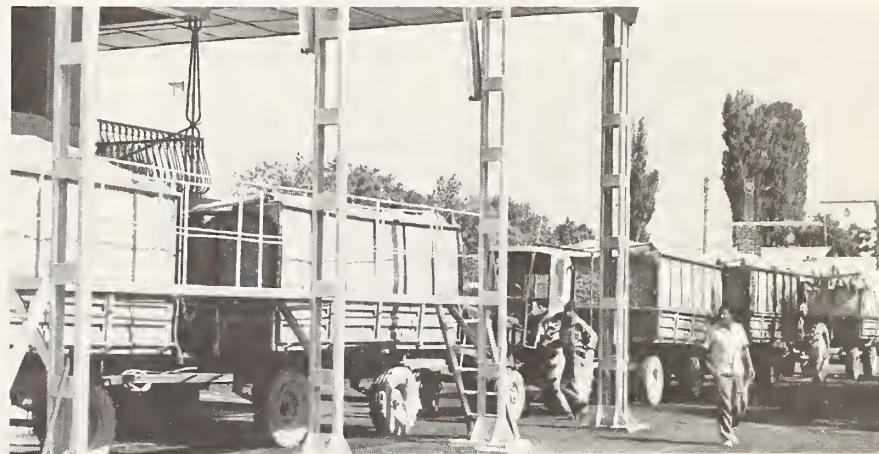
Most cotton is planted in 60-centimeter (24-inch) rows, and plants are spaced about 6 inches apart. Ninety-centimeter (35-inch) rows also are used. The Soviets would like to increase plant population by reducing drill distance to about 4 inches and hopefully increasing yield as well as fertilizer and water efficiency. However, their efforts in this direction to date have resulted in increased plant height, significant reduction in fruiting, and increased incidents of

Table 3. USSR: GRAIN SOWN ON IRRIGATED LAND IN CENTRAL ASIA, 1966-75

[In 1,000 hectares]

Year	Uzbekistan	Kirgizia	Tadzhikistan	Turkmenistan	Total USSR
1966	156	271	53	86	7,201
1967	146	290	48	87	7,457
1968	223	281	46	81	7,755
1969	189	262	48	48	8,170
1970	176	250	46	59	8,640
1971	157	252	42	65	8,976
1972	196	260	50	82	9,273
1973	217	274	48	90	9,776
1974	255	269	43	89	10,258
1975	250	272	40	108	10,746

Source: Narkhod SSR, 1966-1975.



Cotton being put into piles at a gin in Bukhara. Unginned cotton is stored in the open during the 11 months of the ginning season.

Cotton arriving at a procurement center in 2-metric-ton trailers, Tashkent. About half the Soviet cotton crop is handpicked so the cotton is clean when it arrives at centers and gins and needs little mechanical cleaning.

Verticillium wilt. The Soviet team which visited the United States in October 1976 was interested in U.S. work that had been done on breeding for high-density planting of Texas stripper cotton.

An interesting cultural practice that Soviet cotton farmers use—one not generally used in the United States—is to cut the tops of the plants mechanically at about 14 to 15 branches or laterals for upland and 17 branches for extra long staple. This is done in early August. The purpose is to channel plant nutrients into the production of fiber rather than vegetable growth, to hasten boll maturation, and to increase picking efficiency.

Chemical defoliation begins about September 5, and handpicking begins soon thereafter. The Soviets defoliate when about 30 percent of the bolls are open while U.S. farmers prefer to wait until 50 to 60 percent of the bolls are open. The method of application is about the same in both countries. About 30 per-

cent of upland crop and 100 percent of extra long staple (ELS) crop is harvested by hand. The Soviets do a very thorough job of picking cotton. Where harvesting machines are used for picking upland cotton, the bottom bolls are first harvested by hand, and the rest is later harvested by machines that pass over the fields two times. All of the cotton that is dropped on the ground is then picked up manually. The first frost generally occurs about October 20.

Another interesting cultural practice is the planting of mulberry trees around cotton fields. All of the fields visited in the Republic of Uzbekistan were surrounded by mulberry trees. The team thought this might be a pest control or wind control measure but was told that it is simply a means of efficient utilization of the land between roads and cotton fields in this section of the country where silk is an important part of the culture and mulberry trees are needed to feed the silkworms.

Fertilizer

About 200 to 300 kilograms of nitrogen, about 120 to 250 kilograms of phosphate (P_2O_5), and 0 to 80 kilograms of potash (K_2O) are used per hectare. The cost of nitrogen is about 56 rubles per metric ton. This is equivalent to \$22, converting at 40 cents per ruble, or \$75 converting at \$1.34 per ruble. Phosphate costs 17 to 22 rubles per metric ton. This is equivalent to \$7 to \$9 at 40 cents per ruble or \$23 to \$29 at \$1.34 per ruble. Potash costs 12 rubles which is equivalent to \$5 converting at 40 cents per ruble or \$16 per metric ton converting at \$1.34 per ruble.

Fertilizer applications are made in granular form and are applied as follows: (1) 60 percent is broadcast and disked into the soil in November, (2) 30 percent is banded below and beside seed with plantings, and (3) 10 percent is side-dressed when plants reach the first-square stage of growth.

Profit and cost of production

Profit is an important concept on Soviet cotton farms even though its calculation is very different from that in the United States. Cotton farms in the USSR are reported to have benefited from more generous treatment as to prices paid, allocation and cost of resources applied, etc., than farms providing some of the other crops.

State farms, of course, belong to the Government in the Soviet Union as does the land on the collective farms. The team was told that Soviet collective farms pay 3 percent of net profit or 4 percent of their gross profit as taxes to the Government, although some pay nothing. Similarly, State farms pay 1 percent of the cost of their fixed assets, which was said to be equal to about 2 percent of the "net profit." State and collective farms pay no rent on land and receive irrigation water at no charge.

A harvester mounted on a tractor costs 10,000 rubles which converts to \$4,000 at 40 cents per ruble or \$13,400 at \$1.34 per ruble. A U.S. self propelled harvester costs about \$40,000. Fertilizer is provided at a very low price. Of course, in a State-controlled economy, inputs are produced and allocated by Government plan, and allocation to buy them may be more important than having the need and money for them.

The provision of irrigation water at no charge is an important item because all Soviet cotton is irrigated compared to only one-third of U.S. cotton. The Soviet Government is considering charging State and collective farms for water at some future date. However, such a change is not likely to be made during the current 5-year plan, which goes through 1980.

In terms of labor, it appears to require several times more hours to produce a bale of cotton in the Soviet

Union than in the United States. This could be expected since one-half of all Soviet cotton is hand-picked while all U.S. cotton is machine picked. Workers receive about 200 rubles per month including bonuses (table 2). This converts to \$80 per month (35 hours per week) or about 52 cents per hour at 40 cents per ruble or \$268 per month or about \$1.75 per hour at \$1.34 per ruble. Soviet workers receive housing, medical care, meals during the cotton harvest, and other benefits at low cost or, in some cases, at no charge. This increases their real wage, making a valid comparison of U.S. and Soviet wages nearly impossible.

The "profitability rate" was given to the team on two of the farms visited and was defined as the difference between the selling price of cotton and the cost of production, divided by the cost of production. The rates given on these two farms were 95 percent and 93 percent (table 2). On the Fifth Anniversary Farm, near Tashkent in Uzbekistan, uses of the 5-million-ruble profit of 1975 included 1 million rubles for bonuses to workers, 1 million for housing, 500,000 for a stadium, and an unspecified amount for meals provided at no charge during the harvest. Another farm manager mentioned that the Government's initial investment in land and machines was repaid from "profit." Of 2.2 million rubles profit made in 1975 by one of the gins visited, the Government took part and the rest was used for bonuses paid to the workers, expansion, and cultural development. Some of these uses imply a definition of profit the same as in the United States, but others would be considered as costs rather than profit according to the market economy concept of profit.

An interesting facet was that farms may deposit their profits in banks and receive interest at a 1 to 2 percent annual rate, and they also may borrow and pay interest at about the same rate.

The cost of production on the farms visited varied from 10 to 23 cents per pound of lint if converted at 40 cents per ruble (table 2). However, the cost would be from 33 to 75 cents per pound at the official rate of exchange of \$1.34 per ruble. U.S. costs, of course, also vary widely.

When the above factors are taken into account, it is obvious that the difference in methods of determining costs in the Soviet Union and the United States is so great that a realistic comparison is not possible.

In terms of man-hours per bale, about 250 man-hours are required to produce a metric ton of seed cotton or 750 hours per metric ton of lint in the USSR, which is equivalent to about 160 hours per bale. The U.S. 1975 crop of 8.3 million bales was produced with a labor requirement of 189 million hours—equivalent to about 23 man-hours per bale. However, here again there are problems in making such a comparison because a large proportion of Soviet cotton is handpicked and very clean, and great

care is exercised to pick all cotton so it is logical that more labor would be required. Also, the comparison may not take account of the labor involved in manufacturing and maintaining machinery used in cotton operations.

In terms of bales picked per machine, it appears that about 150 bales are picked per machine during one season in the Soviet Union while U.S. machines, picking irrigated cotton, average about 800 bales during the season. One reason for this large difference is that while all U.S. cotton is machine picked, mechanical harvesting on most Soviet farms does not start until after the bottom bolls have been harvested by hand, meaning that Soviet harvesters have a shorter period of operation and have less cotton available on each plant than U.S. harvesters.

Ginning

The Soviets refer to gins as cotton factories. They operate 10 to 11 months of the year; ginning starts in early September and is usually completed sometime during July. The entire 1976/77 crop of approximately 11,300,000 bales of upland cotton was to be ginned on 152 saw-type ginning plants during 1976 and 1977. About 875,000 bales of ELS cotton was to be ginned on 18 roller gins. The majority of the gin stands have 80 saws. The saws are 32 centimeters (12 1/2 inches) in diameter and turn about 720 rpm. The team was told that the majority of the 170 gins are Soviet made. The rollers in the roller gins are considerably smaller in diameter than American ELS gins and have less capacity. One ELS gin the team observed in operation was ginning at the rate of approximately one-third bale per roller gin stand hour. This gin had 48 gin stands in place, but only half were in service when the team was there.

The Soviets pile their seed cotton outdoors at gins and procurement centers in huge 5,000-metric-ton mounds, which are covered with canvas when necessary. Seed cotton is first weighed and laboratory tested for moisture, foreign matter, fiber strength, and length. Color, apparently, is not a direct factor in determining cotton quality in the Soviet Union.

Upland seed cotton is placed in one of four grade categories and each mound is one grade. The team was told on several different occasions that this was the only time the cotton was graded and that grade certificates were issued on railcar lots rather than on individual bales, as in the United States. Other visitors to the Soviet Union have reported that some gins have equipment for taking samples at the gin automatically before the bale is made and that grade certificates for train carloads are issued on the basis of these samples. Whatever the method of sampling used, laboratory results of tests made on the samples follow each lot of cotton to its domestic or export destination. The Soviets do not often agree to arbitra-

tion because the certificates of test results are considered sufficient proof of the quality being shipped.

The seed cotton is removed from the mounds by hand and mechanical means, and then is fed into open end air suction pipes about 18 inches in diameter. The pipes are extended hundreds of feet to the mound being ginned. The seed cotton is fed into batteries of big reel-type driers for drying and some trash removal. These driers are always outside at the end of a building that receives the dried cotton for cleaning.

Seed cotton cleaning after reel drying is done through low-volume cleaning machines that resemble gin feeders. Some moting is done in this cleaner, but motes are discharged into the trash and the cleaned seed cotton is dropped onto a belt conveyor that is positioned under the cleaner, where a U.S. saw gin stand would be located. This belt carries the cleaned cotton to the end of the building where it is picked up by air suction and conveyed in this manner to the gin building for separation of the seed from the lint. This gin building was adjacent to the cleaning building on one gin, but at another gin the pipes extended from the seed cotton cleaning building in overhead pipes, several hundred feet, across the gin yard to the ginning and bale press building.

The Soviets do not, at present, do any lint cleaning after ginning. They do not do as much lint cleaning as is necessary in the United States, where the total crop is harvested by machines. The Minister of Light Industry expressed an interest in lint cleaning, and the team was told that lint cleaning is planned for the future.

The Soviets make a bale that is about the same width and girth as the U.S. flat bale, but is about 42 inches in height. It weighs between 210 kg. (462 lb.) and 220 kg. (484 lb.) net. Some gins use 12 bands of wire (twist hooked). The newest tie is 11 bands of heavy gage straps. This strap is about the same width as the American automatic bale tie strap, three-fourth inch, but slightly thicker. The strap is connected by an "S" lock buckle. Both ends of the strap have a loop that is spot welded by the manufacturer of the strap. The Ministry of Light Industry told the team that the bale compression is about the equivalent of the universal density bale, which has a density of 28 pounds per cubic foot.

The cotton observed was very clean first pick, by hand. One upland gin had ginned 102,000 bales between January 1 and September 25, 1976. At the time of the visit, it was ginning about 15 bales per hour. This was 50 percent of capacity. The gin had two presses with six employees on each press, plus a weigher who recorded for both presses. Each press had one pressman, two men dressing the press and tying, two women sewing ends on the bale bagging, and one man placing the bale on a conveyor belt that carried the cotton across a scale where a woman

weigher recorded the bale number and weight of the bale and stamped the information on the bagging. The bagging used was pressed cotton, cross-stitched with heavy thread to hold it together. Pressed cotton is a nonwoven disposable fabric made of chewed-up fibers plus an adhesive. It may be repressed and processed again but cannot be washed and reused.

All gins the team visited were located on rail tracks. Cotton is loaded and shipped as ginned directly for export or to textile plants within 2 or 3 days after ginning. The gins visited had almost no facilities either covered or uncovered for storing ginned cotton.

These gin plants were quite old in appearance, but the team thought the gins and gin areas were neat and clean. The Soviets are known to have purchased new high-speed cotton gins from the United States. A few of these new gins are in operation, but the team did not have the opportunity to observe any of them. An observer from a trip to the USSR a few years ago said the roller gins appeared to be the English manufactured Platt roller gin or a copy of that gin. In overall efficiency the Soviets are getting about all that is possible in volume from a gin plant.

Ginning costs were given at two of the gins visited. One gave a cost of 35 rubles per metric ton of lint

cotton for upland. The other gave a cost of 100 rubles per metric ton of lint for both upland and ELS cotton. The lower figure of 35 rubles was used in computing the costs and margins in table 6.

In calculating ginning outturn, the basis was seed cotton procurement and lint cotton outturn (tables 4 and 5). The ginning outturn for 1975 came to 32.1 percent for all cotton. The outturn was 32.4 percent for upland and 29.3 percent for extra long staple. The outturn appears to have declined during the past few years, which probably is the result of a higher percentage of the cotton being machine picked.

Prices and margins

The textile mill that the team visited was paying two rubles per kilogram (2,000 rubles per metric ton) for upland cotton which averaged 30 percent Grade 1, 45 percent Grade 2, and 25 percent Grade 3. This is equivalent to 80 cents per kilogram or .366 cents per pound converting at 40 cents per ruble. Using a farm price of 30 cents per pound of lint, this allows a .066 cent-per-pound margin from the farm to the mill. With the cost of ginning given as 35 rubles per metric ton or .006 cent per pound of lint, the transportation and other costs of getting the cotton from

Table 4. USSR: PROCUREMENTS OF UPLAND AND EGYPTIAN TYPE COTTON AND CALCULATED GINNING OUTTURN, CROP YEARS 1964-76

Year beginning August 1	Seed cotton procurement			Lint cotton outturn			Ginning outturn ¹		
	Upland	Egyptian types ²	Total	Upland	Egyptian types ²	Total	Upland	Egyptian types ²	Total
1964	1,000 metric tons 4,974	1,000 metric tons 311	1,000 metric tons 5,285	1,000 metric tons 1,702.5	1,000 metric tons 99.9	1,000 metric tons 1,802.4	Percent 34.2	Percent 32.1	Percent 34.1
1965	5,261	401	5,662	1,788.4	128.6	1,917.0	34.0	32.1	33.8
1966	5,596	385	5,981	1,885.0	120.9	2,005.9	33.7	31.4	33.5
1967	5,497	473	5,970	1,882.1	139.1	2,021.2	34.2	29.4	33.8
1968	5,479	466	5,945	1,815.6	136.2	1,951.8	33.1	29.2	32.8
1969	5,302	406	5,708	1,818.1	137.4	1,955.5	34.3	33.8	34.2
1970	6,266	624	6,890	2,157.6	185.9	2,343.5	34.4	29.8	34.0
1971	6,447	654	7,101	2,152.3	195.0	2,347.3	33.4	29.8	33.0
1972	6,661	635	7,296	2,192.7	207.0	2,399.7	32.9	32.6	32.9
1973	7,036	628	7,664	2,213.3	187.3	2,400.6	31.4	29.8	31.3
1974	7,734	674	8,408	2,456.3	203.2	2,659.5	31.8	30.1	31.6
1975	7,180	684	7,864	2,326.6	200.3	2,526.9	32.4	29.3	32.1
1976 ³	7,651	630	8,281	2,440.0	190.0	2,630.0	31.9	30.2	31.8

¹ Calculated.

² Egyptian types are labeled "fine fibered" and apparently are barbadense variety cottons.

³ Lint outturn for 8.3-million-metric-ton crop was estimated using estimated ginning rate of 0.318.

Source: Supplied by USSR Ministry of Agriculture in response to request by U.S. Cotton Team to the USSR, September 1976. Data supplied did not include 1976 crop, which was announced January 5, 1977, by Minister of Agriculture Mesyats.

Table 5. USSR: LINT COTTON OUTTURN OF UPLAND AND EXTRA LONG STAPLE, CONVERTED TO BALES, CROP YEARS 1964-76¹

[In thousands of 480-lb bales]

Year beginning August 1	Lint cotton outturn		
	Upland	Extra long staple ²	Total
1964	7,819	459	8,278
1965	8,214	591	8,805
1966	8,658	555	9,213
1967	8,644	639	9,283
1968	8,339	626	8,964
1969	8,350	631	8,981
1970	9,910	854	10,764
1971	9,885	896	10,781
1972	10,071	951	11,022
1973	10,166	860	11,026
1974	11,282	933	12,215
1975	10,686	920	³ 11,606
1976	11,207	873	12,093

¹ This table converts the lint cotton outturn figures shown in metric tons in table 4 into 480-pound bales.

² The Extra long staple is labeled "fine fibered" but apparently is barbadense variety cotton.

³ Using ginning rate of 0.318.

the farm to the mill would be about 320 rubles per metric ton or \$0.06 per pound (table 6).

This mill was making 40's count yarn on the basis of Soviet and not U.S. standards. The meaning of 40's count in Soviet standards is not known to the U.S. team. This yarn was being sold for 2.85 rubles per kilogram. This is equivalent to \$1.14 per kilogram or

52 cents per pound at 40 cents per ruble or \$3.82 per kilogram or \$1.73 per pound at \$1.34 per ruble. All yarn was for the domestic market. The mill, which had 450 employees, produced 4,250 metric tons of yarn in 1975 using entirely the open end spinning process. The conversion of cotton to yarn was 90 percent (1 pound of cotton makes 0.9 pound of yarn), which would have required about 22,000 bales of cotton.

This mill had storage capacity for only 1 month's cotton supply. Three months' supply was considered more desirable, and plans were to expand the amount of storage space in the future.

Market structure

The Soviet Ministry of Agriculture is in charge of cotton production, and the Ministry of Light Industry is in charge of ginning, textile mills, and exports. Actual exports are made by Exportljon, which is part of the Ministry of Foreign Trade, but which exports cotton on a commission basis for the Ministry of Light Industry.

The Ministry of Light Industry decides which varieties of cotton it wants and needs, and the Ministry of Agriculture in turn transmits this request to State and collective farms, all of which are under its jurisdiction. After the seed cotton is produced by these farms, it is taken in trailers, which have a capacity of 2 metric tons, to procurement centers or gins.

After the cotton is ginned, it is loaded on trains and shipped to mills or to ports. Odessa on the Black Sea and Leningrad on the Baltic were mentioned as export ports. Cotton also is shipped by train to Pacific coast ports. There was no evidence that ginned cotton is stored for very long anywhere in the country, but there is the possibility that at ports and

Table 6. USSR: ESTIMATED PRICES AND MARGINS FOR UPLAND LINT COTTON, 1976¹

Item	Rubles per metric ton	Equivalent in U.S. cents per kg		Equivalent in U.S. cents per lb	
		At \$1.34 per ruble	At 40 cents per ruble	At \$1.34 per ruble	At 40 cents per ruble
Farm price	1,645	220.40	65.80	² 100.00	² 30.00
Ginning cost	35	4.70	1.40	2.10	0.60
Transportation and other	320	42.90	12.80	19.50	6.00
Cost to mill	2,000	268.00	80.00	121.60	36.60

¹ The cost to the mill and ginning charge were given by the Soviets. The farm price is an approximate average of the six farms visited (see footnote 2) and the transportation cost is a residual.

² The \$1.00 per pound at \$1.34 per ruble or 30 cents per pound at 40 cents per ruble, which are used as rough rounded averages of the sales prices in cents per pound shown in table 2, work back to a farm price of 1,645 rubles per metric ton of lint or 594 rubles per metric ton of seed cotton. For method of calculation, see footnote 7 of Table 2.

perhaps elsewhere, some stocks are maintained from which to select cotton for shipment. Cotton was said to be shipped to ports only in response to export sales. Consequently, it appears that cotton stocks are primarily in railcars in transit or in the form of un-ginned cotton at the gins. This seems logical in view of the fact that the Soviet Union's 170 gins are operating 10 to 11 months of the year while gins in most other countries operate during a much shorter period of time. For example, the 2,900 gins in the United States gin most of the crop during about a 3-month period, so U.S. cotton stocks, after January 1, are mostly in the form of ginned cotton.

Location is not taken into account in the domestic pricing of Soviet cotton. All mills pay the same price for a given grade of cotton delivered to the mill regardless of the location of the mill. Also, for the purpose of internal valuation, cotton at any port has the same value as at any mill. In other words, a given grade of cotton that sells for 2 rubles per kilogram would be valued at 2 rubles per kilogram whether at a Black Sea port, a Pacific port, or a mill in Leningrad, or at a port on the Black Sea. Most mills are located in the European part of the Soviet Union although there are preliminary plans to locate new mills closer to the production area.

Trade

Soviet cotton exports have been increasing rapidly and in 1975/76 accounted for one-fifth of total world exports. Average Soviet exports for the years beginning August 1, 1973-75 were 3.5 million bales compared with 4.5 million for the United States.

Cotton is the Soviet Union's highest value agricultural export, replacing grain in 1972. Cotton accounts for about 3 percent of total export earnings. The Soviet Union's largest exports are machinery and equipment, crude petroleum and petroleum products, and synthetic fuel oil.

Exports are very important since the Soviet Union has a large trade deficit with countries outside the Soviet bloc. That deficit in 1975 was estimated at about \$7 billion. Cotton exports help to alleviate the deficit and in 1974 and 1975 were equivalent to 35 percent of the value of grain imports.

The Soviet's decision to produce cotton rather than grain on irrigated land in Central Asia is probably based on the fact that 1 hectare of cotton will yield 4 bales of lint cotton which, at the estimated 1976 average world price of about \$0.75 per pound, was worth \$1,400. As a byproduct, it would yield nearly 2 tons of cotton seed worth at least another \$200 at U.S. prices, whereas the approximately 4 metric tons of wheat that could be produced on 1 hectare of irrigated land was worth only about \$675.

Thus, the cotton that is produced on 1 hectare will buy as much wheat as can be produced on 2 hectares.

The weather in Central Asia is too cold for both a crop of wheat and a crop of soybeans in the same year. At least in the short run, it is more economical to export cotton and import grain than to produce grain on the irrigated land of Central Asia. One problem is that, with so high a proportion of land in cotton, problems of maintaining yields may be encountered at some time in the future.

A long-term trend of Soviet cotton exports from 1960-75 shows the increase in exports during this period was to France, Japan, Bulgaria, and Yugoslavia. Exports to other countries remained relatively stable (table 7).

Exports to France may be considered as exports to Western Europe, in general, because much Soviet cotton is marketed via merchants in France to other countries in Western Europe. The USSR surpassed the United States in 1973 as the largest supplier to Western Europe and, in 1973-75, supplied 20 percent of the cotton imported by these countries compared to 9 percent supplied by the United States.

By 1972 the USSR was supplying half as much cotton to Japan as the United States and, during 1973-75, the USSR supplied 16 percent of Japan's cotton needs compared to 30 percent supplied by the United States.

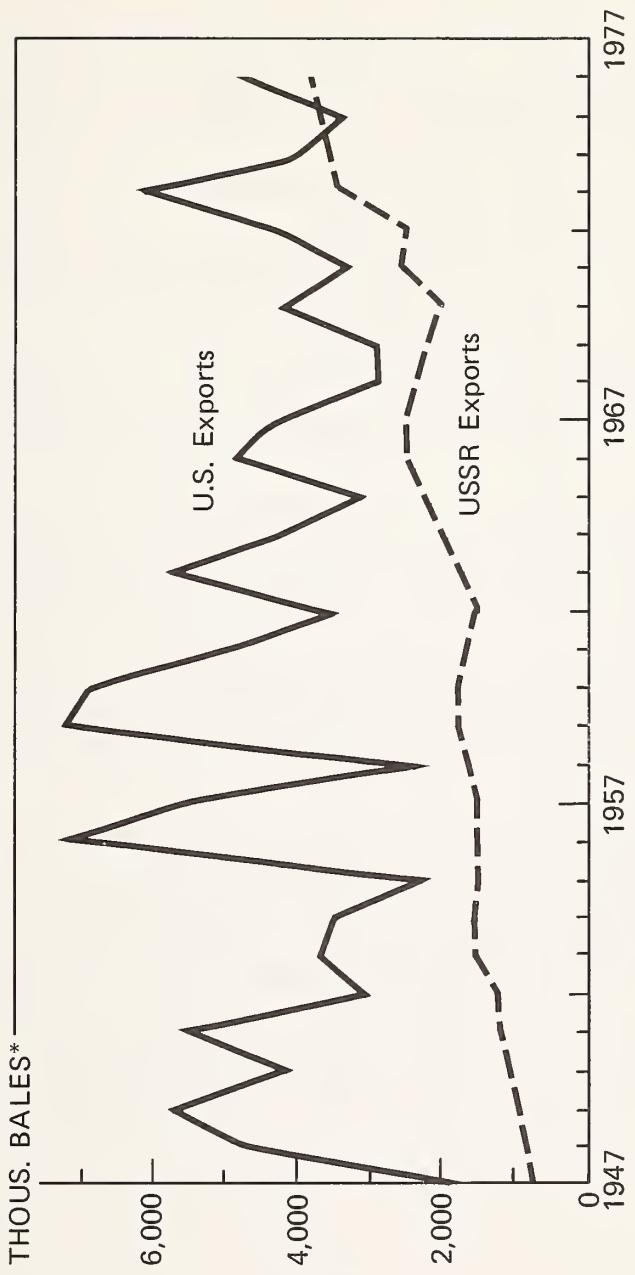
The USSR, during the 1973-75 period, had imported an average of 624,000 bales annually, mostly from Egypt, Syria, and Iran. Most of the cotton from Egypt was ELS cotton. Cotton is used by these countries primarily to pay for goods and services imported from the USSR (table 8).

Future goals

Soviet cotton farmers, unlike their counterparts raising some of the other crops, have always exceeded their goals in recent years. The 9th Soviet Five-Year Plan called for an average production of 6.8 million tons of seed cotton during 1971-75, and 7.7 million tons actually were produced, 113 percent of the goal. For 1975, the annual goal was 7.7 million tons, and 7.9 million tons were produced, 103 percent of the target (tables 9, 10).

The 10th Soviet Five-Year Plan calls for an average outturn of 8.6 million tons annually during 1976-80, or 25 percent more than in the last 5-year plan. The present goal for 1980, the terminal year in the plan, is for 9.0 million tons, or 17 percent more than the goal for 1977. This is broken down on a regional basis as follows: Uzbekistan, 5.8 million; Turkmenistan, 1.2 million; Tadzhikistan, 900,000; Azerbaidzhan, 600,000; Kazakhstan, 290,000, and Kirgizia, 210,000.

UNITED STATES AND UNION OF SOVIET SOCIALIST REPUBLICS:
LONG-TERM TREND IN COTTON EXPORTS 1947-1976



*BALES OF 480 LBS. NET.

Table 7. USSR: EXPORTS OF COTTON, BY COUNTRY OF DESTINATION, CALENDAR YEARS 1960-75

[In 1,000 bales of 480 lb net]

Destination	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
Eastern Europe:																
Bulgaria	83	85	91	89	122	143	178	141	166	173	214	181	204	222	228	194
Czechoslovakia	228	273	197	187	296	293	278	254	321	214	330	278	280	274	338	302
German Democratic Republic	396	382	428	356	362	393	380	363	360	320	452	383	376	360	413	415
Hungary	177	162	174	169	178	185	176	186	208	137	229	165	198	175	207	244
Poland.	353	344	255	251	378	365	413	348	371	347	473	480	440	413	525	515
Romania	143	134	124	125	135	137	139	144	135	127	151	153	130	140	123	144
Subtotal	1,380	1,269	1,177	1,471	1,516	1,564	1,436	1,561	1,318	1,849	1,640	1,628	1,584	1,834	1,814	
Cuba	14	69	29	38	55	76	61	63	78	62	77	88	80	86	103	96
Korea, DPR	9	46	47	43	38	47	45	46	61	46	53	53	36	33	38	28
Vietnam, Soc. Rep. of	0	0	0	0	9	9	0	14	14	14	14	14	14	9	9	25
Subtotal	23	115	76	81	102	132	106	123	153	122	144	155	130	128	166	156
Western Europe:																
Belgium	4	4	(¹)	(¹)	6	2	22	26	23	7	0	16	16	64	41	16
France.	46	25	23	19	23	61	67	66	36	45	17	116	201	285	234	418
Germany, Federal Rep. of	94	38	52	62	69	90	82	82	48	55	16	43	49	111	72	119
Italy	58	46	32	17	11	36	74	75	22	48	12	13	66	23	0	57
Netherlands	4	0	6	(¹)	12	7	8	10	6	0	0	5	3	0	0	3
United Kingdom	46	40	15	18	24	66	88	68	59	14	54	93	93	150	116	126
Subtotal WE	252	153	128	116	145	262	341	327	203	214	59	247	428	633	463	739
Austria	23	24	40	35	22	29	28	14	15	11	7	4	30	25	11	12
Finland	58	42	60	55	55	56	58	60	54	49	62	44	51	49	25	28
Switzerland	3	5	5	0	0	1	3	4	0	0	0	0	0	0	0	0
Yugoslavia	5	0	0	0	0	0	24	79	112	69	97	67	152	163	136	192
Subtotal WE	341	224	233	206	222	348	454	484	384	343	225	362	661	870	635	971
Japan	47	38	0	12	9	62	140	306	373	255	132	315	518	541	601	476
Other:																
Algeria	0	0	0	0	0	0	5	5	0	0	0	0	0	0	0	13
Canada	0	0	0	0	1	43	53	99	67	24	4	0	0	0	0	2
Hong Kong	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0
Other countries	2	(¹)	(¹)	1	3	1	0	1	8	15	18	39	59	222	157	243
Subtotal	2	(¹)	(¹)	1	4	44	68	105	75	39	22	39	59	222	157	258
TOTAL	1,793	1,757	1,578	1,477	1,808	2,102	2,332	2,454	2,546	2,077	2,372	2,511	2,996	3,345	3,393	3,675

¹ Less than 500 bales.Source: *Foreign Trade of the USSR*, 1975 and earlier issues.

Table 8. USSR: IMPORTS OF COTTON, BY COUNTRY OF ORIGIN, CALENDAR YEARS 1960-75

[In 1,000 bales 480 lb net]

Country	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
Afghanistan	27	32	43	55	71	65	42	49	30	11	16	25	37	41	78	54
Brazil	0	28	113	184	42	56	68	37	16	24	4	0	0	46	0	0
China, People's Rep.	215	52	38	0	0	0	0	0	0	0	0	0	0	0	0	0
Egypt	510	422	311	457	346	492	452	328	273	294	564	497	317	311	260	314
Greece	9	13	36	31	31	23	29	23	32	37	48	4	43	0	54	6
Iran	39	33	32	43	52	33	29	51	63	114	93	99	112	64	80	77
Iraq	0	2	1	2	0	2	1	1	2	4	2	4	0	0	0	0
Mali	0	0	0	5	5	5	5	9	7	7	7	9	5	0	0	0
Mexico	13	1	14	40	0	0	0	0	0	0	0	0	0	0	0	0
Morocco	0	0	0	0	(1)	3	4	5	3	4	0	0	0	0	0	0
Nicaragua	0	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0
Pakistan	0	0	0	28	0	5	9	24	21	35	52	28	48	9	14	14
Sudan	25	45	60	87	18	54	32	40	59	60	273	275	7	0	0	20
Syria	48	22	36	85	89	98	108	85	103	179	109	138	161	110	142	125
Turkey	0	0	0	0	5	2	5	9	11	13	8	34	35	0	0	17
Uganda	0	0	0	0	0	0	1	3	0	6	0	0	0	0	0	0
Yemen	0	0	3	3	3	2	6	0	4	1	0	0	0	0	0	0
Others	1	0	3	4	4	0	2	0	1	0	2	2	0	19	15	1
Total	887	650	690	1,038	666	840	793	664	628	783	1,184	1,115	765	600	643	628

¹ Less than 500 bales.Source: *Foreign Trade of the USSR*, 1975 and earlier issues.

TABLE 9. USSR: AREA, YIELD, AND PRODUCTION OF SEED COTTON BY REPUBLIC, 1969-76

Crop year	Uzbekistan	Tadzhikistan	Turkmenistan	Azerbaijan	Kazakhstan	Kirgizia	Other Republics	Total USSR
Area:								
1969	1,596	242	312	198	118	74	0	2,540
1970	1,709	254	397	193	118	75	0	2,746
1971	1,707	261	401	206	118	77	0	2,770
1972	1,681	261	405	197	116	75	0	2,735
1973	1,683	262	410	198	115	74	0	2,742
1974	1,731	265	485	210	115	74	0	2,880
1975	1,773	272	487	211	110	71	0	1 2,924
1976 ¹	1,778	282	491	216	110	72	0	2,949
Production:								
1969	3,712	626	692	299	230	140	0	5,699
1970	4,495	727	869	336	276	187	0	6,890
1971	4,511	788	920	382	296	204	0	7,101
1972	4,710	743	931	431	292	189	0	7,296
1973	4,909	806	1,008	410	313	218	0	7,664
1974	5,330	879	1,117	531	340	211	0	8,408
1975	5,014	836	1,078	451	283	202	0	7,864
1976 ¹	5,338	840	1,053	530	310	208	0	8,281
Yield:								
1969	2,326	2,587	2,218	1,510	1,949	1,892	0	2,244
1970	2,630	2,862	2,189	1,741	2,339	2,493	0	2,509
1971	2,643	3,019	2,294	1,854	2,508	2,649	0	2,564
1972	2,802	2,847	2,299	2,188	2,517	2,520	0	2,668
1973	2,917	3,076	2,459	2,071	2,722	2,946	0	2,795
1974	3,079	3,317	2,303	2,529	2,957	2,851	0	2,919
1975	2,828	3,074	2,214	2,137	2,573	2,845	0	2,689
1976 ¹	3,002	2,978	2,145	2,454	2,818	2,889	0	2,808

¹ Preliminary.

Source: Information previously supplied by the USSR Ministry of Agriculture was updated in response to request by U.S. cotton team to the USSR, September 1976.

TABLE 10. USSR COTTON PLANS AND THEIR FULFILLMENT, SEED COTTON BASIS

Calendar year	Plan	Production	Share of plan
1971-75, average	MT 6.8	MT 7.7	Percent 113
1971	6.2	7.1	115
1972	6.6	7.3	111
1973	6.8	7.7	113
1974	7.3	8.4	115
1975	7.7	7.9	103
1976-80, average . . .	8.6	--	--
1976	¹ 7.9	8.3	102
1977	8.3	--	--
1980	9.0	--	--

¹ Later revised to 8.1 and then 8.2.

According to an early 1977 article by Monov, an official of Gossplan, 495,000 hectares of new irrigated land will be brought into cotton cultivation dur-

ing 1976-80. If this occurs, 10,000 metric tons of seed cotton could be produced on 3,440,000 hectares (17 percent above 1976 area) with a yield of 2,907 kilograms per hectare, only 3 percent above the average yield of 1974/75-1976/77. Area goals by Republic were not given, but the team visited the three major cotton-growing Republics and discussed the possibilities for expanded cotton area. The thinking in Uzbekistan is that area will increase from 1,770,000 hectares in 1975 and 1976 to 2 million hectares by 1980, and that yields will increase from 3,000 kilograms per hectare of seed cotton in 1976 to 3,500 kilograms by 1985. This implies a yield of about 3,250 kilograms of seed cotton per hectare (922 pounds of lint per acre) and a crop of about 6.5 million metric tons of seed cotton (9.5 million bales of lint) by 1980. Uzbekistan produced 5.3 million metric tons in 1976.

In Turkmenistan the 900-kilometer-long Kara Kum Canal is being extended, and another 15,000 hectares are expected to be in cotton and 85,000 hectares in other crops by 1980. This will mean a total cotton area of 500,000 hectares compared with

485,000 hectares in 1976. The plan is for a crop of 1.2 million metric tons of seed cotton (1.8 million bales of lint) which could be produced with a yield of only 2,400 kilograms of seed cotton (68.1 pounds of lint) per hectare. However, the team was told that production is expected to be increased in the future more as a result of yield increases than as a result of area increases so a 1.2 million-metric-ton crop could be on the conservative side. Turkmenistan produced 1.1 million metric tons in 1976.

Some increase in area is expected in Tadzhikistan, although probably not much. The Nurek Dam project, which already has brought in 40,000 hectares of irrigated land, will add 40,000 when complete. However, it is unknown how much of this will be in cotton. This area is mountainous and said to be more suitable for industry than for agriculture.

Using a crop of 6.5 million metric tons for Uzbekistan, 1.2 million for Turkmenistan, and a crop equal to the highest level of the past 5 years for each of the other Republics, a total USSR crop of about 9.7 million metric tons of seed cotton (3.1 million metric tons or 14.3 million bales of lint) is possible by 1980. However, somewhat larger increases in Turkmenistan, Tadzhikistan, and some of the other Republics are likely so that a crop of about 10 million metric tons of seed cotton (3.2 million metric tons or 14.7 million bales of lint) is possible. Of course, there is always the possibility that the Soviets could decide to put a larger percentage of their land in other crops in order to achieve a different rotation pattern or meet the needs for other crops. However, the need for foreign exchange may preclude this.

Looking at the situation in another way, cotton area in the USSR advanced 6.3 percent during 1971-76. Assuming the same rate of increase during 1976-80, the area would rise to 3.1 million hectares by 1980. Yields rose 15.2 percent for 1969-71 to 1974-76. If this rate of increase were to continue, production could attain 10 million metric tons by 1980.

Beyond 1980, the outlook becomes more uncertain. Chances are that Central Asia has exhausted the easy sources of water and may be approaching the near-term limits of the available water supply. A decree was signed August 5, 1976 to ". . . work out the technical plans to implement the first stage of diverting flows of sections of the Obi, Yenisey and Irtysh rivers in Siberia to Central Asia and Kazakhstan. . .". Such a program will require tremendous resources and would appear to have great ecological implications for the areas from which waters are to be diverted. Although resources already have been committed to this project, it is a very long-range one and apparently has been very controversial. It remains to be seen whether Soviet planners will decide that commitment of resources on such a large scale can be put to better use elsewhere.

Consumption

Cotton is considered by the Soviets to be hygienically preferable to manmade fiber and, consequently, high priority has been given to production not only of medium staple but also to the production and import of extra long staple cotton. High priority also, has been given to silk production in Soviet Central Asia, where it is used in the traditional dress. Both extra long staple cotton and silk have been under severe competition from lower priced manmade fiber in the United States and most Western countries.

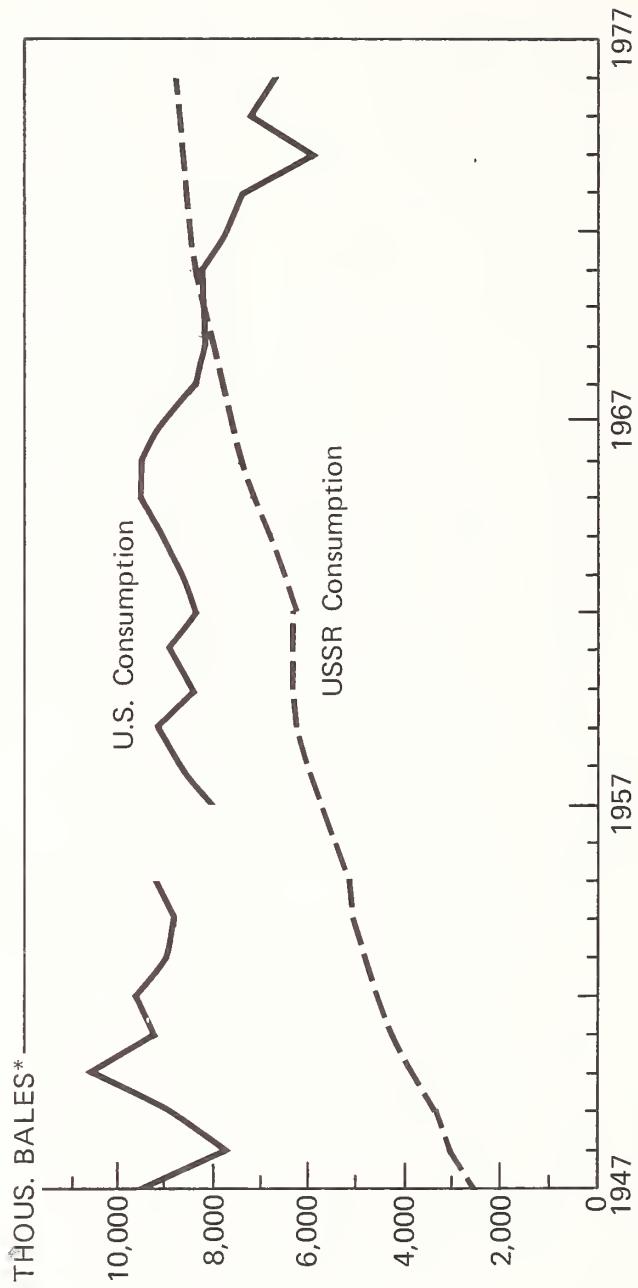
Cotton's importance to Soviet planners is indicated by its relative importance in per capita fiber availability. According to the Food and Agriculture Organization of the United Nations (FAO), cotton accounted for about one-half of per capita total fiber availability in the USSR during 1974 compared with one-third each in Eastern Europe, in Western Europe, and in the United States. Per capita fiber availability is domestic mill consumption plus textile imports minus textile exports (table 11).

Per capita availability of all fibers in the Soviet Union, at 15.1 kilograms per year, was about the same as that of Eastern Europe and Western Europe, each 14.3 kilograms. It was more than double the world average of 6.9 kilograms, but below that of the United States at 22.5 kilograms. However, it should be kept in mind that U.S. per capita consumption is exceptionally high as a result of a high rate of fiber utilization for carpets and certain industrial uses.

Soviet per capita cotton availability at 8.0 kilograms per year was about the same as that of the United States at 7.5 kilograms. Soviet and U.S. per capita cotton availability are both well above that of Eastern Europe, 4.8 kilograms, Western Europe, 4.9 kilograms, and the world average, 3.4 kilograms.

Soviet per capita availability of manmade fibers, at 3.8 kilograms per year, is above the world average of 2.9 kilograms but well below Eastern Europe at 7.6 kilograms, Western Europe at 7.9 kilograms, and the United States at 14.4 kilograms. However, this may change in the future as Soviet manmade fiber consumption has been steadily expanding and plans are for a further 50-percent expansion in production from 1975 to 1980 (table 12). Even then, however, per capita consumption of manmade fiber will be well below that in developed countries generally. To the extent that continued expansion of manmade fiber production slows up a further growth in cotton consumption, there could be that much more cotton released for export in the future. Cotton has declined in relative terms from about two-thirds of total fiber consumption in 1955 to about one-half in 1974. However, in absolute terms, Soviet lint cotton mill consumption has been trending upward from an average of 7.2 million bales in 1964-66 to an average of 8.7 million bales in 1974-76. This increase in total

UNITED STATES AND UNION OF SOVIET SOCIALIST REPUBLICS:
LONG-TERM TREND IN COTTON CONSUMPTION 1947-1976



*BALES OF 480 LBS. NET.

cotton mill consumption is in sharp contrast with the downward trend in total cotton mill consumption in the United States and Western Europe during the past 20 years.

Of course, a major reason why mill consumption of cotton has declined in the United States and Western Europe is that these countries are importing and using ever larger volumes of cotton textiles. The FAO data, which adjusts for trade in cotton textiles, show that availability of cotton for domestic consumption in the USSR increased by 49 percent from 1961-63 to 1972-74 while it decreased by 3 percent in the United States and increased 10 percent in Western Europe. In all developed countries, the increase was 13 percent.

Another sharp contrast with trends in the United

States and Western Europe was the upward trend in Soviet silk consumption. Silk cloth output increased steadily from 675 million square meters in 1960 to 801 million square meters in 1965, and further, to 1,146 million in 1970 and 1,508 million square meters (about 190,000 metric tons), in 1975. Silk has become an almost negligible factor in U.S. and Western European textile markets.

Linen is also used much more intensively in the Soviet Union than in most other countries. The FAO estimate of per capita consumption of linen at 1.7 kilograms is larger than that of wool or synthetic fibers. Per capita consumption apparently has remained around the same level since 1955. Per capita wool consumption in the USSR also is higher than in the United States or Eastern or Western Europe.

Appendix

TABLE 11. USSR: PER CAPITA CONSUMPTION OF APPAREL FIBERS, 1955, 1960, 1965 AND 1970-74 WITH COMPARATIVE DATA FOR EASTERN EUROPE, WESTERN EUROPE, UNITED STATES, AND WORLD FOR 1965 AND 1974

Calendar year	Cotton	Wool	Flax	Manmade fibers			All fibers	Population
				Total	Cellulosic	Non-cellulosic		
USSR:				Kg	Kg	Kg	Kg	Million
1955	5.5	0.7	1.6	0.7	0.7	0	8.6	197.0
1960	6.5	1.4	1.7	1.4	1.2	.2	11.0	214.4
1965	6.5	1.2	2.0	2.1	1.7	.4	11.8	230.6
1970	7.2	1.5	1.7	2.9	2.1	.8	13.3	242.8
1971	7.5	1.5	1.9	3.1	2.1	1.0	14.0	245.0
1972	7.5	1.5	1.7	3.5	2.2	1.2	14.1	247.5
1973	7.8	1.5	1.7	3.6	2.3	1.3	14.6	249.8
1974	8.0	1.6	1.7	3.8	2.3	1.5	15.1	252.1
Eastern Europe:								
1965	4.4	.8	.9	4.6	4.0	.6	10.7	101.9
1974	4.8	.9	1.0	7.6	4.5	3.1	14.3	107.9
Western Europe:								
1965	4.8	1.6	.4	4.3	2.6	1.7	11.1	342.5
1974	4.9	1.2	1.3	7.9	2.4	5.5	14.3	363.1
United States:								
1965	10.8	1.2	.2	11.6	4.0	7.6	19.8	194.6
1974	7.5	.3	1.3	14.4	2.4	12.0	22.5	214.8
World:								
1964-66 av	3.2	.5	.2	1.7	1.0	.7	5.6	3,363.0
1974	3.4	.4	1.2	2.9	.9	2.0	6.9	3,891.0

¹ Estimated.

Source: Food and Agriculture Organization of the United Nations, Per Capita Fiber Consumption, 1973 to 1974 and earlier reports in the same series.

TABLE 12. USSR PRODUCTION OF MANMADE FIBERS, 1955, 1960, AND 1965-75

[In 1,000 metric tons]

Calendar year	Cellulosic			Non-cellulosic			Total
	Filament	Staple	Total	Filament	Staple	Total	
Production:							
1955	44.5	57.1	101.6	6.8	2.0	8.8	110.4
1960	101.2	95.0	196.2	10.7	4.3	15.0	211.2
1965	164.6	165.2	329.8	54.2	23.3	77.5	407.3
1966	181.3	180.7	362.0	69.8	26.5	96.3	458.3
1967	191.6	203.2	394.8	85.2	30.6	115.8	510.6
1968	206.0	217.9	423.9	95.8	35.5	131.3	555.2
1969	212.0	223.0	435.0	103.2	39.1	142.3	577.3
1970	222.1	234.3	456.4	115.1	51.6	106.7	623.1
1971	230.0	243.0	473.0	132.3	70.7	203.0	676.0
1972	245.3	262.4	507.7	157.2	81.4	238.6	746.3
1973	259.3	283.8	543.1	176.2	110.7	286.9	830.0
1974	267.0	301.6	568.6	191.0	127.5	318.5	887.1
1975	281.0	309.0	590.0	231.0	134.0	365.0	955.0
Producing capacity:							
1976, March	308.0	320.0	628.0	240.0	215.0	455.0	1,083.0
1977, December	308.0	320.0	628.0	265.0	225.0	490.0	1,118.0
1980, Plan	--	--	705.0	--	--	745.0	1,450

Compiled from annual surveys in June issues of *Textile Organon*, published by Textile Economics Bureau, New York. 1975 data from *Soviet Statistical Yearbook, 1975 (Narodnoe Khozyaistvo SSSR, 1975)*.

TABLE 13. USSR: SUPPLY AND DISTRIBUTION OF RAW COTTON

[In 1,000 bales of 480 lb net]

Year beginning August 1	Area 1,000 ha	Yield, kilos per ha	Beginning stocks	Production	Imports	Total supply	Con- sumption	Exports and/or reexports	Ending stocks
1964	2,460	733	1,600	8,300	750	10,650	7,000	2,000	1,650
1965	2,440	786	1,650	8,800	800	11,250	7,200	2,200	1,850
1966	2,465	820	1,850	9,200	700	11,750	7,500	2,400	1,850
1967	2,440	828	1,850	9,300	650	11,800	7,700	2,500	1,600
1968	2,445	798	1,600	9,000	700	11,300	7,900	2,300	1,100
1969	2,540	770	1,100	9,000	1,000	11,100	8,000	2,250	850
1970	2,745	854	850	10,800	1,150	12,800	8,350	2,450	2,000
1971	2,770	847	2,000	10,800	900	13,700	8,400	2,800	2,500
1972	2,735	877	2,500	11,000	670	14,170	8,500	3,200	2,470
1973	2,740	876	2,470	11,000	600	14,070	8,600	3,350	2,120
1974	2,880	923	2,120	12,200	650	14,970	8,700	3,550	2,720
1975	2,920	865	2,720	11,600	500	14,820	8,700	3,700	2,420
1976	2,950	895	2,420	12,100	400	14,920	8,800	3,800	2,320

TABLE 14. USSR: SUPPLY AND DISTRIBUTION OF RAW COTTON

[In 1,000 metric tons]

Year beginning August 1	Area, 1,000 hectares	Yield lb/ha	Beginning stocks	Pro- duction	Imports	Total supply	Con- sumption	Exports and/or reexports	Ending stocks
1964	2,460	733	348	1,802	167	2,317	1,453	431	433
1965	2,440	786	433	1,907	177	2,517	1,515	487	515
1966	2,465	820	515	2,006	156	2,677	1,574	523	580
1967	2,440	828	580	2,021	140	2,741	1,651	546	544
1968	2,445	798	544	1,952	156	2,652	1,698	495	459
1969	2,540	770	459	1,956	221	2,636	1,727	490	419
1970	2,745	854	419	2,344	249	3,012	1,778	534	700
1971	2,770	847	700	2,347	198	3,245	1,843	608	794
1972	2,735	877	794	2,400	146	3,340	1,872	697	771
1973	2,740	876	771	2,401	136	3,308	1,931	734	643
1974	2,880	923	643	2,660	138	3,441	1,894	775	772
1975	2,920	865	772	2,527	109	3,408	1,894	805	709
1976	2,950	895	709	2,630	87	3,426	1,915	827	684

Source: Area and production data are official figures except production for 1976 which is estimated from official seed cotton production estimates. Imports and exports for August 1 through July 31 are calculated from official calendar year figures by adding 5/12 of the calendar year during which August 1 falls and 7/12 of the calendar year during which July 31 falls. Consumption figures for calendar years, 1964-66 and 1968-70, as reported to International Cotton Advisory Committee, placed on crop year basis using 5/12 of 1964 quantity plus 7/12 of 1965, etc. For other crop years to 1974/75, estimated from July 1 - June 30 using cotton yarn production figures divided by 0.90 for crop year beginning August 1, 1961, 0.855 for 1966, 0.845 for 1967, 0.82 for 1970, 0.81 for 1971 and 1972, and 0.80 for 1973 and 1974. The factors are derived from mill consumption and yarn production figures for 1962-70 and have been assumed to decline since then. Consumption is a residual for 1974/75 - 1976/77.

TABLE 15. USSR: PHYSICAL-MECHANICAL PROPERTIES OF COTTON FIBER QUALITY ACCORDING TO THE SOVIET STANDARDS

Characteristics	Standards According to Fiber Grades						
	Otborny-O or Extra	Pervy-I or First	Vtoroy-II or Second	Tretyi-III or Third	Chetvertyi-IV or Fourth	Pyatyi-V or Fifth	Shestoy-VI or Sixth
Maturity coefficient	2.1	2.0	1.8	1.6	1.4	1.2	1.2
Breaking load strength, in grams	4.9	4.4	3.9	3.4	3.0	2.5	2.5
Total trash and defects, percent:							
Calculated	1.9	2.1	2.6	3.5	5.3	8.6	12.5
Maximum allowable	4.0	5.0	6.5	7.5	12.0	16.0	22.0
Moisture content, percent ¹	8.0	8.0	9.0	10.0	11.0	12.0	12.0

¹ In relation to the absolutely dry weight of the fiber.

Source: V/O Exportljon, Moscow, *Cotton Growing and Ginning in the USSR* and confirmed October 1976 by USSR Ministry of Light Industry.

TABLE 16. USSR: QUALITATIVE PROPERTIES FOR HANDPICKED AND MACHINE PICKED SEED COTTON ACCORDING TO SOVIET STANDARDS

Grade of seed cotton	Grade of lint cotton	Breaking strength per fiber	Trash content		Moisture content			
			Average in handpicked and machine picked cotton	Maximum allowable in handpicked cotton only	Average moisture in handpicked and machine picked cotton in—		Maximum allowable in handpicked cotton only in—	
					Central Asia and Kazakhstan	Azer-baid-zhan	Central Asia and Kazakhstan	Azer-baid-zhan
1	Grams Otborny-O or Extra	Grams 4.9 and higher	Percent	Percent	Percent	Percent	Percent	Percent
1	Pervy-I	4.4-4.8	0.5	3.0	8.0	9.0	9.0	10.0
2	Vtoroy-II	4.9-4.3		5.0	10.0	11.0	10.0	12.0
3	Tretyi-III	3.4-3.8	1.9	8.0	11.0	12.0	11.0	13.0
3	Chetvertyi-IV	3.2-3.3		1.9	11.0	12.0	11.0	13.0
4	Chetvertyi-IV	3.0-3.1	3.6	16.0	13.0	14.0	13.0	14.0
4	Pyatyi-V	2.5-2.9		16.0	13.0	14.0	13.0	14.0
4	Shestoy-VI	2.4 and less						

Source: V/O Exportljon, Moscow, *Cotton Growing and Ginning in the USSR* and confirmed October 1976 by USSR Ministry of Light Industry.

Table 17. U.S. EQUIVALENTS OF SOVIET GRADES AND STAPLE LENGTHS FOR COTTON LINT

Soviet grade	Trash content of Soviet grade according to Soviet source	U.S. equivalent grade according to Soviet source ¹	Noncotton content of U.S. grades According to USDA	Soviet staple length	U.S. equivalent according to Soviet source
O — Otoborny	Percent 1.5	Above Good Middling	Percent	Millimeters 27/28 28/29	Inches 15/16 31/32
I — Pervyi	1.5	Good Middling		29/30 30/31	1 1-1/32
II — Vtoroy	{ 2.6 3.2	{ Strict Middling Middling	{ 1.7 2.2	31/32 32/33	1-1/16 1-3/32
III — Tretyi	6.0	Strict Low Middling	2.9	33/34 34/35	1-1/8 1-5/32
IV — Chetvertyi	{ 10.0 15.0	{ Low Middling Strict Good Ordinary	{ 3.9 5.3	35/36 36/37	1-3/16 1-7/32
V — Pyatyi	20.0	Good Ordinary	6.9	37/38 39/40	1-1/4 1-7/16
VI — Shestoy	to 22.0	Tinged Low Middling up		40/41	1-1/2

¹ Correlation of cotton lint grades resulting from recent varieties is subject to revision.

Source: Data given, except in column 4 and comparisons made are from V/O Exportljon Moscow, *Cotton Growing and Ginning in the USSR* and confirmed October 1976 by the USSR Ministry of Light Industry in response to the U.S. cotton team's request, October 1976. Column 4 gives typical noncotton content of the U.S. grades as determined by USDA, (*Summary of Cotton Fiber and Processing Test Results*, USDA, AMS). These figures appear to indicate much lower trash content for U.S. grades than ascribed to them by the Soviet data in column 3.

TABLE 18. USSR: INTRODUCTION OF LONG-STAPLE COTTON VARIETIES DEVELOPED AT THE INSTITUTE FOR SEED SELECTION AND BREEDING OF LONG-STAPLE COTTON, MINISTRY OF AGRICULTURE, TURKMENISTAN¹

Variety	Year	Maturity period	Yield of seed cotton	Lint output	Weight per cotton boll	Staple length	Metric number (fineness)	Brk. load or strength fiber	Length at break	Resistance to wilt	Grade of fiber
213	1936	Days 145-165	Cut/ha ² 25-30	Percent 29.0	Grams 3.4	Millimeters 39-40	7500	Grams 4.8	KM 36.4	Percent 66.4	1
910-I	1947	145-155	25-30	30.0	3.3	37-38	8910	5.1	35.3	77.5	2
5476-I	1948	140-148	30-35	33.0	3.7	38-39	7090	4.8	34.0	75.5	2
5904-I	1953	140-145	35-40	34.0	3.5	36-37	5830	5.5	32.2	54.7	3
8763-I	1958	145-155	35-40	32.0	3.2	40-41	7590	4.7	35.6	69.6	1
9123-I	1960	130-140	25-30	34.3	2.8	39-40	7970	4.8	38.2	1.7	1
9041-I	1961	140-150	35-40	32.1	3.2	38-39	7010	5.1	35.7	45.0	2
9078-I	1962	140-150	35-40	33.5	3.1	37-38	7300	4.7	34.3	16.5	2
9155-I	1967	130-145	35-40	32.0	3.4	40-41	7370	4.9	35.8	3.8	2
9647-I	1970	130-145	27-35	28.3	3.3	39-40	8150	4.8	39.0	2.9	1

¹ Institute is located in Iolotan Turkmenistan. Often referred to as the Iolotan Institute.

² Centners (100 kilograms) per hectare.

Source: Institute for Seed Selection and Breeding of Long-Staple Cotton, USSR Ministry of Agriculture, October 1976.

TABLE 19. COTTON EQUIVALENT OF COTTON
PRODUCTS AVAILABLE FOR CONSUMER USE IN
THE USSR, UNITED STATES, WESTERN EUROPE
AND ALL DEVELOPED COUNTRIES, 1961-63 AND
1972-74

[In 1,000 metric tons]

Year	USSR	United States	Western Europe	Total for all developed countries
1961	1,291	1,815	1,613	4,277
1962	1,313	1,908	1,546	4,163
1963	1,367	1,832	1,577	4,144
1972	1,963	1,963	1,689	4,822
1973	1,946	1,804	1,772	4,927
1974	2,007	1,617	1,768	4,517
Change from 1961-63 to 1972-74, percent . . .	+49	-3	+10	+13

Source: Food and Agriculture Organization of the United Nations, *Per Caput Fibre Consumption, 1973 to 1974*, and earlier reports in the same series.

TABLE 20. USSR: RAW SILK PRODUCTION

[In metric tons]

Year	Uzbekistan	Kirgizia	Tadzhikistan	Turkmenistan	Other ¹	Total USSR
1940	693	84	254	149	636	1,816
1965	936	109	313	272	1,015	2,645
1970	1,172	123	322	229	1,174	3,020
1974	1,379	122	363	276	1,295	3,435
1975	1,399	124	355	275	1,308	3,461

¹ Composed principally of Azerbaijan and Georgia in Transcaucasus, which are the largest silk producers next to Uzbekistan, but which do not produce cotton.

Places and Organizations Visited by the U.S. Cotton Team to the USSR¹

Moscow:	Dushanbe:
Ministry of Agriculture	Ministry of Agriculture, Tadzhikistan SSR
Ministry of Light Industry	Tadzhik Scientific Research Institute of Agriculture
Ministry of Land Reclamation and Water Resources	
Textile mill	
UZBEKISTAN SSR	
Tashkent:	
Ministry of Agriculture, Uzbekistan SSR	
All-Union Scientific Research Institute for Cotton Growing	
Central Asian Scientific Research Institute of Agricultural Economics	
State Farm "Fifth Anniversary of Uzbekistan" in Nizhnechirchikskiy Rayon	
Cotton gin in Nizhnechirchikskiy Rayon	
Central Scientific Research Institute for Cotton ginning	
Bukhara:	
Collective Farm "Engels" in Gizhduvanskiy Rayon	
Cotton gin	
Samarkand:	
Collective Farm "October" in Bulungurskiy Rayon	
TADZHIKISTAN SSR	
	Dushanbe:
	State Farm "Kuybyshev" in Kurgan-Tyube Rayon, Dushanbe Oblast
	Kurgan-Tyube Branch of the Tadzhik Scientific Research Institute of Agriculture
	TURKMENISTAN SSR
	Ashkhabad:
	State Farm "Path to Leninism"
	Ministry of Agriculture, Turkmenistan SSR
	Iolotan:
	Scientific Research Institute of Seed Selection and Breeding of Long-Staple Cotton in Mary Oblast
	Bayram-Ali:
	State Farm "Moscow" in Nizhnechirchikskiy Rayon, Mary Oblast
	Mary:
	Cotton gin, Mary Oblast

Members of the Soviet Cotton Team to the U.S., September 28-October 12, 1976²

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¹ Visit made under the U.S.-USSR Agreement on Agricultural Cooperation, and took place August 30 - September 18, 1976.

² Soviet delegation to study new progressive technology of growing and harvesting cotton on the basis of complex mechanization.

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Cover photo: Soviet workers pile cotton outside a gin in Taskhent. (All photos in this publication were taken by U.S. Cotton Team Leader Robert W. Johnson.)

